NETHERLANDS
EAST-INDIAN
SAN-FRANCISCO-
COMMITTEE.

DEPARTMENT OF AGRICULTURE
INDUSTRY & COMMERCE

No. XI

ARCHITECTURE IN
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1914
Boekh. en Drukkerij v/h G. C .T v. DORP & Co.
Semarang-Soerabaia-Den Haag.

The Court of Justice at Medan (under construction).

Architecture in Netherlands East India.

From an ethnographical and ethnological point of view, it is undoubtedly extremely interesting to become acquainted with the architecture of the different groups of the Netherlands East Indian population.

However, neither as regards size nor with a view to construction do the native buildings occupy a place of the slightest prominence in the architecture of the present time, the less so as an appreciable influence has never been exercised on the constructional works of the foreign races. This is quite evident in view of the fact that when the Europeans landed in Netherlands East India between the years 1500 and 1600,— the period when colonization practically started, — there was no trace of Western cultivation in this colony. Public buildings, such as schools, hospitals, Government offices etc. were of course absent, and the majority of the population lived in bamboo or wooden huts with roofs of vegetable material. From that early period only a few temples and native palaces are worth mentioning from an architectonical point of view. They date from the Hindoo times; but when the Dutch arrived in Java they had already become ruins. They were partly destroyed when Mohammedism was introduced in this country, which is generally regarded as having taken place during the beginning of the 15th century.

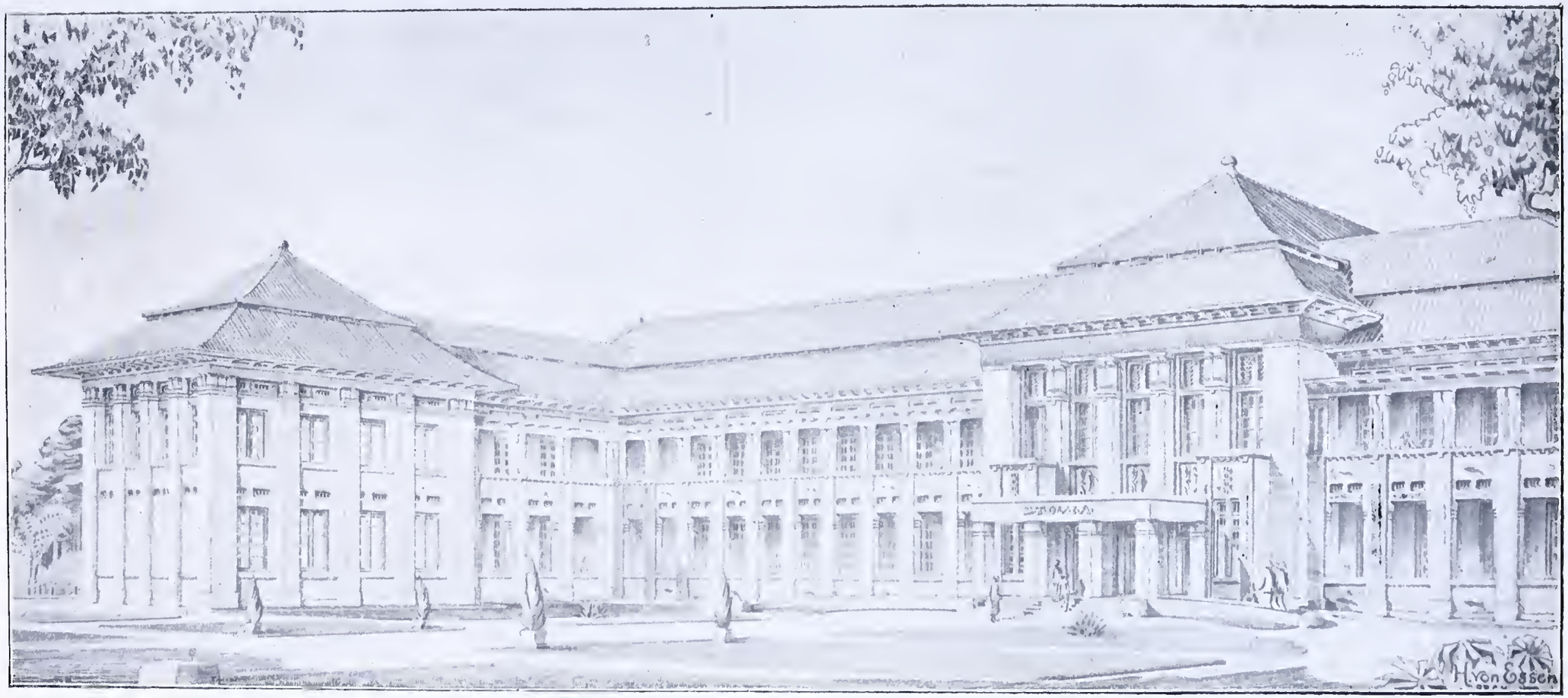
These monuments include the Boroboedoer and similar temples, which although highly interesting cannot serve as a sample of local architecture. The former, the greatest monument of Java, which is richly decorated, is a pyramidic structure. The latter merely consists of a small cell, the construction of which meant the sacrificing of enormous quantities of material; but even taking for granted that these monuments possess qualities suitable for adoption by the foreigners who settled here for trading purposes only, the fact remains that their number was very small indeed and that they were situated too far from the coasts to exercise any influence on the style to be adopted by the foreigners, not to mention the fact that already then their structures were mere ruins.

The same refers to some of the native palaces, of which at the present times even the ruins have disappeared. The temples built by the Mohammedans during the 15th century also could not exercise much influence. Of these there were only a few, viz: the mosques at Demak and Grissee.

Neither were the dwellings of the large majority of any appreciable influence, as the short life of the native buildings, their inflammable construction and their very limited safety were factors which made them entirely unfit for the foreign colonist. In addition to these circumstances it must be considered that most of the prominent settlements of the Dutch administration in this Archipelago date from a more recent period, when for the Government buildings in the oldest settlements a certain type had already been adopted which naturally was adhered to later on. It is evident that in a country where the science of architecture was of so little importance no architects were to be found, so that the foreigners who settled here had to rely on their own knowledge for the erection of their fortifications, dwellings, etc., and the consequence thereof was that each one of these applied his own national architecture, which even in the present times is still often the case, although it must be said that climatical requirements are now-a-days more fully taken into consideration.

No national colonial architecture exists at present even after the three centuries during which the Dutch were established in the East. Political and economical conditions have never promoted this, whereas the mild climate and the fertility of the soil have never created anxiety on the part of the uncivilized population to acquire better and more permanent dwellings.

From the preceding it may be explained that at present only two methods of architecture are to be found in Netherlands East India, to wit, that of the Dutch and that of the Chinese, of which the former has greatly influenced the latter, although the Chinese have been established in this Colony far longer than the Dutch. Lately the Chinese are even inclined to dispense with their architecture and to follow the example of the Europeans. The Chinese structures are not worth being specially mentioned.



Projected School for native doctors at Weltevreden.

Head-building of the school for native civil officers at Madioen.

They are nearly all dwellinghouses and temples of the same type as that found everywhere in East Asia.

The Dutch who, with the exception of the period from 1811 to 1817, administered Netherlands East India are the founders of the public buildings, the number of which especially during the last decade has considerably increased, principally as a consequence of the definite introduction of the Government administration even for the most remote corners of the Archipelago.

The importance of this Government task may appear from the fact that the Government Budget for 1914 contains an item of $ 2,500,000, only for new buildings, for the civil service (consequently not including military constructions) and also neither including buildings for the railway service, the Government mines, and the Forest Department, nor the repairs to present constructions of such character.

For the ordinary upkeep, an item of $ 300,000 was allotted.

Very soon after the sea-route to Netherlands East India had been discovered by Cornelius Houtman in 1595, the direct trade between the Netherlands and this Archipelago started, and it was found necessary to build a permanent settlement, for which purpose a treaty was made with the prince of Bantam in Western Java. With the Britishers, Portuguese and others, the Dutch subsequently lived in a special quarter outside the walls of the capital which was also called Bantam.

The influence of the Dutch became stronger, and already during the beginning of the 17th century they were transferred to another larger territory which they closed in by brick walls. They gradually settled down definitely, and from this period date the first buildings of Dutch origin. They were all fortified settlements surrounded by brick and earthern walls, at the outside of which — the same as in Holland — a moat was constructed. In Ambon, Macassar, Menado and other places these fortifications are still to be seen. Of the oldest — that of Bantam — interesting ruins are still in existence, the same as in old Batavia, where remnants from this first pe-

riod of the Dutch establishment in India are worth visiting. Batavia was the settlement which extended most rapidly and which later on became the capital of the Colony. In this town, a good many buildings dating from the 17th and 18th century remain, and these give an excellent idea of the architecture of those days. As explained above it is clear that these buildings practically represent the national type, not only as regards the architectonical principles, but also as far as the general arrangement of the houses is concerned, notwithstanding the fact that with a view to the climate the rooms of the dwellings are much larger. However the local requirements were not taken into consideration to a great extent. Varandahs etc. were absent. The dwellings were a copy of the houses as they were occupied by the better classes in Holland and were built in non-intersected rows. The country seats for a long time also represented an European type. The country seat of the Governor-General Van Riebeeck at present occupied as the head quarters of the Mining Department is a characteristic example. The closed nature of the building is typical. The windows, the beam ceilings with carved key pieces, the richly decorated skylights of the doors and the artistic balustrades of the staircases remind of the Dutch architecture of those days. The public buildings of that period also have the same properties. The town hall at Batavia with its cross windows, the big warehouses and the churches have all been designed to Dutch models. Public buildings for the native population in those days were non-existent. The possession of colonies then only meant the fostering of commercial interests. It is noteworthy, however, that already in 1640 Batavia had a Chinese hospital.

It is natural that in the beginning, buildings were only erected within the ramparts of the fortified towns, but in consequence of the rapid growth, buildingplots were very soon no more obtainable and people were thereby compelled to build their houses close together and to have them storied. The result was that in 1627 a special official had to be charged with the inspection of the construction of houses.

Only towards the end of the 19th century was the method of architecture modified when safety was secured, in consequence

Presence-hall by the Governor's palace at Weltevreden.

of which it was no more necessary to build entirely within the walls. Experience led to the abolishing of closed houses, and open varandahs were more and more applied. The system of building storied houses could also then be abandoned.

It goes without saying that from a hygienic point of view this was highly recommendable, but principally owing to Governor-General Daendels' energy the narrow streets of Batavia were soon abandoned by the Europeans. This part of the town was situated very low, and the higher suburb Weltevreden which was laid out on a larger scale was much more preferable. The same happened in Samarang and Sourabaya. By this method of building the houses at further distances from each other, these towns as well as smaller places in the interior — where the example was soon followed—, were soon enlarged. However as this resulted during the last decade in a higher land market, the inhabitants are now again compelled to economise in connection with building plots, the more so as at the same time the prices for building materials and the cost of labour have substantially increased. Government has had to check this by issuing regulations to prevent a non-desired accumulation of buildings. On the other hand however it would be impossible to adhere to the old system of scattered buildings to the former degree as the cost in connection therewith would be simply prohibitive. The demand for house accommodation especially in the smaller places exceeds the supply. Private enterprise is not in a position to meet the requirements, and Government is in consequence thereof forced to erect houses for the Government officials. It is natural that the Government dwellings as regards the compounds and the houses themselves compare favourably with the private dwelling houses. A Government dwelling house on an average has four rooms each from 25 to 30 square metres, and in addition to this a front and a back varandah of from 35 to 40 square metres, this forming a main building of at least 180 square metres. In the so-called outhouses, the kitchen, stores, bathrooms, and servant-quarters are to be found, and an area of 120 square metres may be regarded the minimum.

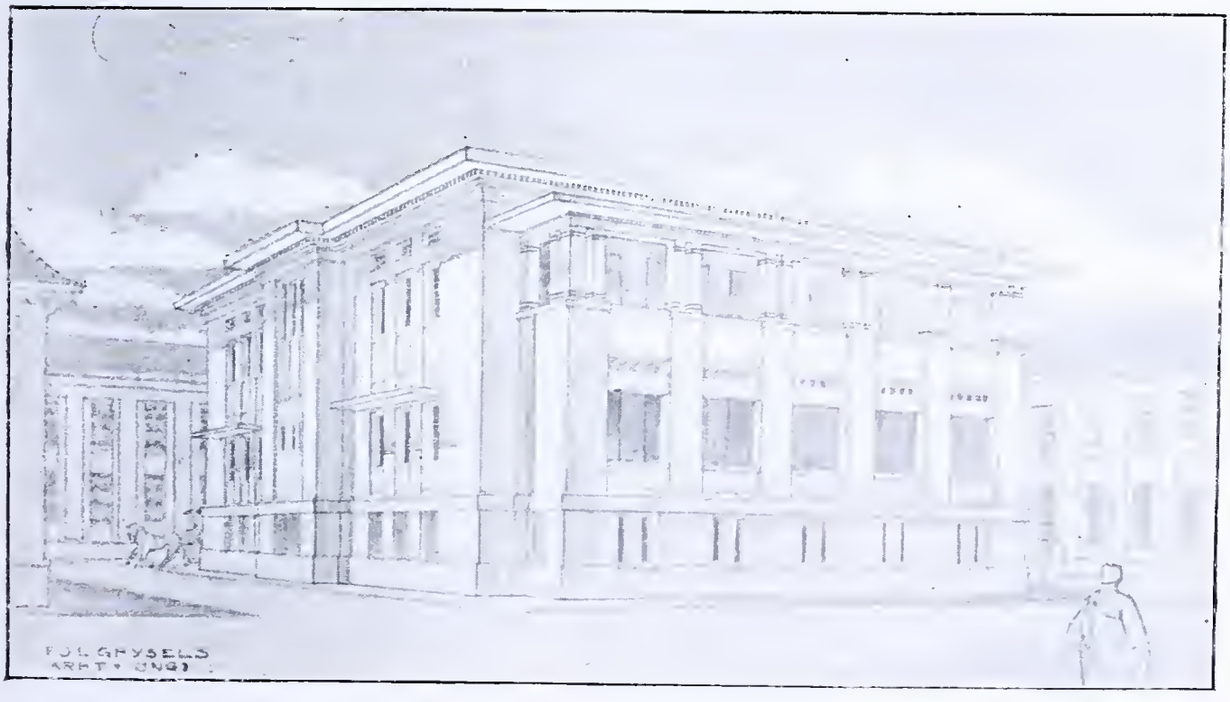
$ 16 to $ 20 for the main buildings, and $ 8 to $ 12 for the

outhouses may be considered the average prices per square metre, including cost of building.

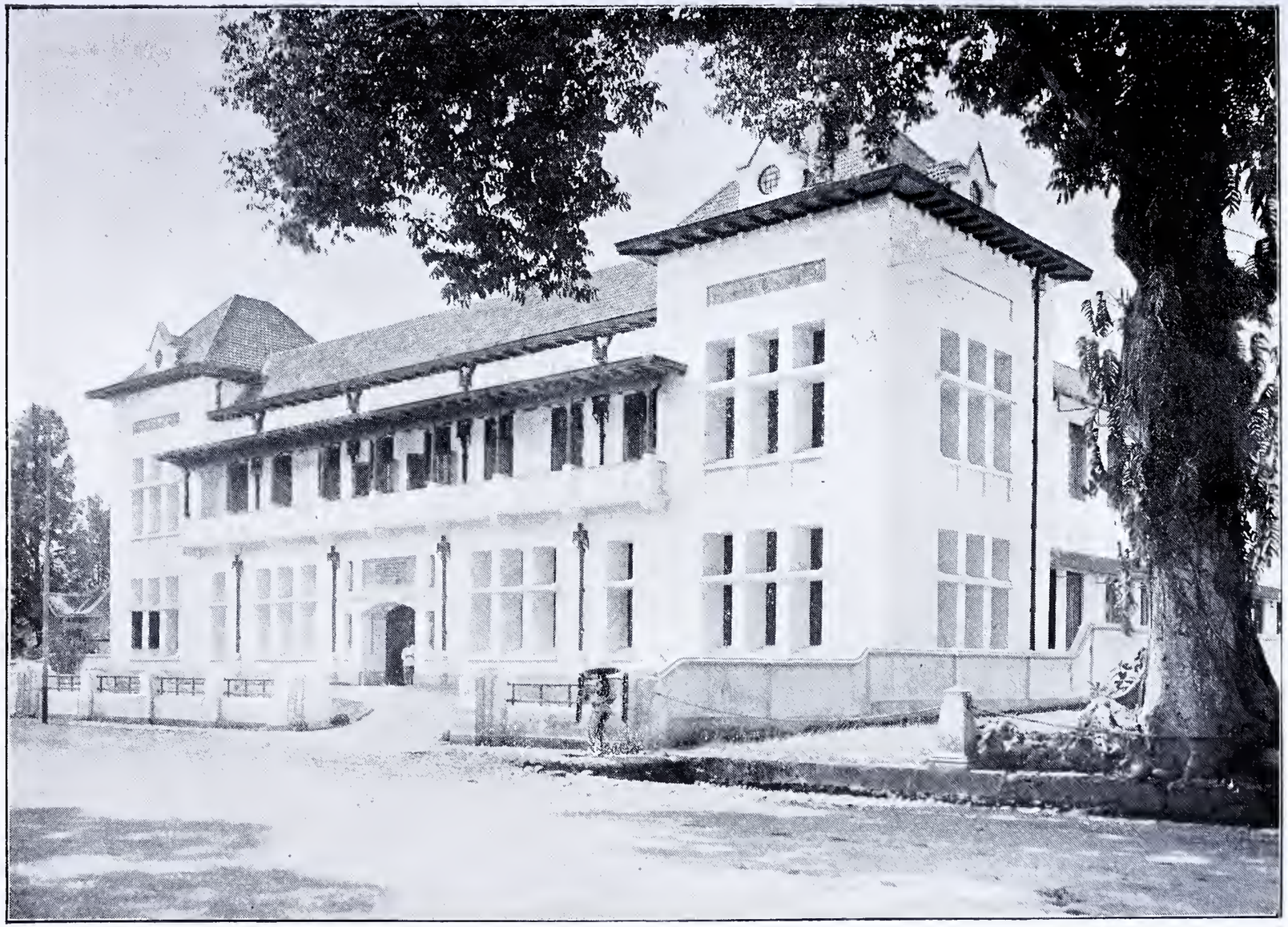
From these figures, a minimum cost for building only would be $ 3,340, and including cost of land, water-wells, boundary hedges,etc. some $ 4,000. This price applies to the less expensive places and is subject to the requirements for architecture inside as well as outside to be limited to the most necessary. For the sake of economy, during the last century houses were as a rule built on most economical lines, so simple even that by avoiding architectonical decorations, monotonous uniformity resulted. It must be said however, that this must also be attributed to the absence of good building material and labour, a drawback which must still be taken into account at present, and at the same time simplicity had to be and still is being adhered to, owing to the great distances between populated centres at which some buildings had and have to be erected. The scarcity of good labourers amongst the natives was most severely felt when the Dutch started to establish themselves in Netherlands East India. It was for this reason that in those days they brought their own labourers, with the assistance of whom, they tried to instruct the natives. The work of the native however was very rough, so that for important parts, such as the carpentry and the painting, Chinese had to be employed. The idea of the professional training classes for natives, where the training is in the hands of European experts, is that the number of good native labourers be increased. The activity in the building line during the last few years is so great and good labourers are so scarce that it is expected to take many years before these classes will supply a sufficient quantity of useful men.

As far as the materials are concerned, it may be said that at several places natural stones are to be found. However the cost of obtaining these is prohibitive for the use of such material, and in addition to this disadvantage, the stone is sometimes too hard, and as a rule not attractive owing to its colour. Quarries are consequently rare. On the other hand much use is made of boulders of which the river beds are very rich. These boulders are used for foundations and sometimes, after

Projected telefon- office at Soerabaja. Front- view.



Projected telefon- office at Soerabaja. Back view.



Department of Agriculture, Industry and Commerce at Buitenzorg.

being crushed, for walls. For masonry work bricks are principally used. These are of native manufacture and generally of inferior quality, especially from the point of view of a Dutchman, who in his native country is accustomed to first-class material only.

It may be recorded however that sofar there is no need for hard bricks as the buildings usually are not storied, and at the same time the brick can be protected against exterior influences by means of plastering, as otherwise the walls would soon look very dirty in consequence of mosses and other vegetable growths. The plastered walls are regularly white-washed, this giving a peculiar aspect to the East Indian towns. When kiln bricks are not available, bricks of Portland cement concrete are now a days frequently used, whereas lime-sand stone is manufactured in Batavia.

For making mortar lime and sand are generally used. The former is burnt from lime stone which is found in many places, and also from coral stone which is obtained from the banks and from the islands situated near to the coast. The sand is as a rule of inferior quality, often mixed with mud, too fine and generally round. It is nearly always of volcanic origin and has in some cases hydraulic properties. As a hydraulic addition, brick meal is frequently used; this is obtained by crushing broken kiln bricks.

For large constructions however this brick meal is obtained from specially burnt clay balls. This material gives satisfactory results and is moreover cheap. Tras is also found occasionally. The application of this material is however very limited because of its high price, a result of the great distances over which it has to be transported.

In Java the Government buildings and the dwelling houses for Europeans and Chinese are as a rule built of brick. At Sumatra's East Coast and nearly everywhere in Borneo, until recently practically no other material but wood was used owing to the absence of lime.

Bricks can be made practically everywhere, and it is therefore a striking fact that in Palembang where very good brick is being made all the houses are built of wood. In other places where tim-

ber is scarce and no lime can be obtained, Portland cement is used. It is apparent that especially lately Portland cement is used in big quantities for ferro concrete constructions whereas at the same time it renders valuable services for the manufacture of Portland concrete bricks; and principally in the flooring tile industry. For flooring nearly everywhere Portland cement tiles are used.

In former years marble was used in large quantities, but its price has recently become too high for the general use of this commodity. At present it costs $ 5 or more per square metre, whereas for $1 per square metre a Portland cement tile flooring can be laid. The price of marble imported from Italy has lately increased to such an extent on account of the higher outward freights. It happened in former years that outward steamers could not obtain sufficient cargo, and loaded marble as ballast, and even bricks from Holland. But such measures are at present unnecessary. Formerly the outhouses were very often paved with red tiles or tiles cut from river boulders. Both materials do not look very well and are not easily obtainable in consequence of which their prices are already higher than Portland cement tiles.

During a short period concrete floors were applied, but the soil not being hard enough, it frequently happened that these floors cracked, and consequently this method had to be abandoned.

European tiles such as the Italian *terrazo* and similar more costly material are exceptionally only found is modern buildings.

As far as timber is concerned Netherland East India can provide for its own requirements. In Java principally teak wood is used, and on the other islands chiefly hard-wood. Of the more superior kinds of hard-wood the following species may be mentioned: From the North of Sumatra *Rassak, Minjak kroee, Damar laut, Marbouw,* and *Camphor-wood.* From the South of Sumatra *Boengoer* and *Tembesi.* Borneo produces *hard iron* wood, and Celebes: *Bajam, Possi-possi, Nanki,* and other kinds.

Although the majority of these timbers are very hard and durable, they have to be applied with great caution; in the first instance great experience is required for distinguishing the inferior from the good species, and furthermore in view of the fact that even the good species very often have properties which

Head-office of the „Javasche Bank" at Batavia.

Central- office of the Netherlands India Railway Cy at Semarang.

the architect must carefully consider. The hard iron wood for instance corrodes iron constructional parts, as is the case with Possi-possi wood. Nails and bolts rust away entirely when coming into contact with these timbers. Bajan wood has the peculiarity of colouring water, and a building constructed of this wood has to be painted four or five times before the coating is sufficiently thick. It is not a good timber for roof constructions as it is liable to leakage, walls and ceilings being very often spoiled by the dripping redbrown water.

Teak wood has no such properties, and therefore it is generally preferred, although the average price for hewn teak logs is at present $ 25 to $ 30 per cubic metre. The price per cubic metre increases with the length of the logs in consequence of the comparative scarcity of long straight stems, and also in view of the higher cost of transport connected with long logs. It is for this reason that long timber is as much as possible avoided.

On account of the high timber prices the ceilings are not made of teak wood. Decorated iron ceiling plates, eternit and similar material is used as a substitute, whereas lately ceilings are also made of plastered metal gauzes — such as teh herring-bone steel. The plaster is made entirely of Portland cement and sand, sometimes also with lime. Gypse cannot be used for that purpose. For the rest the ceilings must be very plain, as experienced stuccoers are not to be found in Netherlands East India. In simple houses as well as in the outhouses mats of native manufacture, plaited of split bamboo, are frequently used.

Finally it should be mentioned that as a roof covering material in Java nearly everywhere kiln tiles of different shapes are used. Most popular are the Flemish tiles, whereas the cross tiles are demanded in increasing quantities. The price of the latter is now very high, viz. $ 24 to $ 28 per thousand so that in most cases it is cheaper to buy this material in Europe. In the principal towns of Sumatra the buildings are also roofed with tiles, the same as in Macassar in the Isle of Celebes. In Borneo however shingles composed of iron wood are used; these are fitted on like slates. Slate is not used in Netherlands East India as it does not stand the climate.

Furthermore corrugated galvanized iron is very popular. Portland cement tiles, eternit, and similar materials are very seldom seen as the results have so far always been disappointing.

As there is no local industry for these articles, locks nails, paints, iron parts etc. have to be imported from abroad. From what was stated above it will be seen that the architect in Netherlands East India has a very limited choice of local building materials, and the same is the case with the imported article. By using the latter the costs of building are very much increased, not only because prices at home are very high, but also in view of the fact that in consequence of the larger dimensions of the tropical buildings, larger quantities have to be used. Wall tiles, for instance, are found very sporadically, whereas water colours for wall decorations are only gradually making headway in the houses of the better classes. As a rule the walls inside and outside the houses are simply white-washed. This has many advantages. In the first place it keeps the house cooler. Secondly the upkeep is cheaper and easier as every native can do his own white washing; finally white wash is always preferable from a hygienic point of view. This latter point is very important in a tropical country, where contageous diseases spread so easily in consequence of the fact that the native idea on the subject of hygiene is very vague.

As a striking example of how lime is used with this end in view, it may be said that in the hospitals the floors and the lower parts of the walls in the barracks for cholera diseases are regularly strewn with a paste of newly burnt lime, which ensures sufficient desinfection.

This brings us to a revision of the precautions which are taken in this country with a view to the climate.

Most attention has always been paid and is still being paid to the coolness in a building. In older buildings it was tried to obtain this result by having high rooms and the walls made as thick as possible, with roofs to slant as low as convenient. It must be said that these old buildings gave every satisfaction, especially when they were provided with varandahs all round

Head office of the Mining Department at Weltevreden.

Detail of the head-office of the Mining Department at Weltevreden.

which enabled the occupiers to have the windows and doors always kept open.

It was sometimes pointed out as a drawback that these varandahs prevented the sun from penetrating into the various rooms, which was especially regrettable for bed-rooms. The opinion of the present medical men however is that the diffusing light of these regions is quite sufficient to act as an effective germdestroyer.

As was already said, the increased prices for land and materials, and the more expensive labour caused a limitation of the size of the buildings, and it is a matter for regret that especially for private dwelling houses this economy has in many respects been exaggerated.

Not only have the varandahs encircling the houses practically all disappeared, but the thickness of the walls have also been reduced to six inches. The rooms are made too small, and by a wrongful application of corrugated galvanized iron as a roof covering, the temperature in many houses has been greatly increased.

However in the hottest places, the traditional open sitting rooms were maintained. The back varandah serves as a sitting and dining room, the front varandah as a drawing room. These rooms being at two opposite sides of the house, it is natural that one of them is always in the shade and consequently cooler.

The Government has on the whole not followed the bad example of many private architects. Only in a few special cases the Government buildings have the outer walls made less than 12 inches, whereas far-projecting roofs are general. In districts where the average temperature is high and where only wood can be used, the Government buildings are provided with varandahs. During the last few years ventilation holes are made in the walls above the varandah roofs, the results of which measure, especially for schools, are very satisfactory. (This method is illustrated in the photograph of the Audience Hall in the palace of the Governor-General at Weltevreden, and that of the school for Government native officials at Madioen).

Special care has always been paid by Government during the last few years regarding the application of corrugated galvanized iron. A proper ventilation is provided for, generally by means of a false roof.

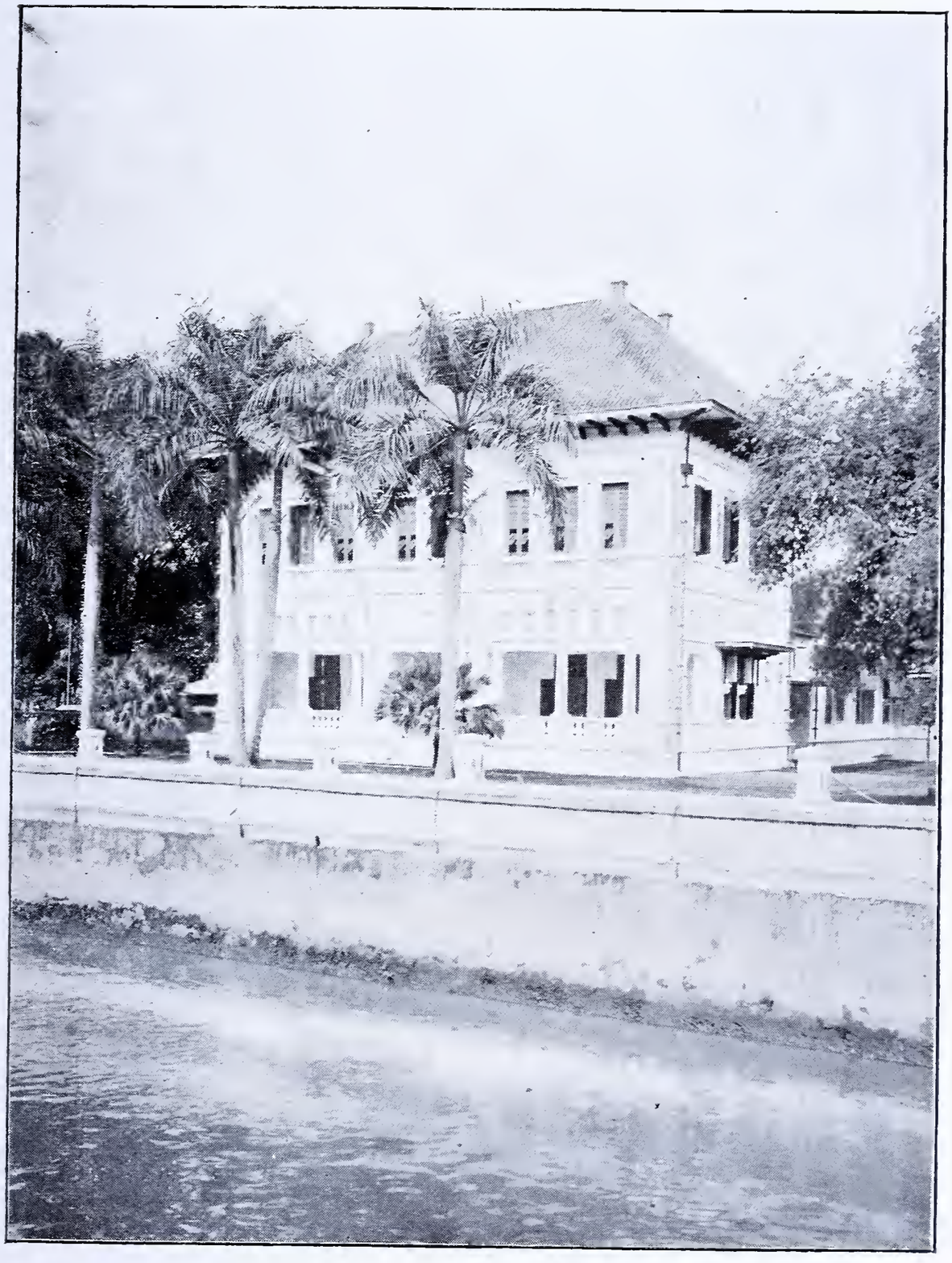
In case of big spannings a combined system has successfully been applied: An intersected shape was chosen and the outside lower fields were covered with tiles and the inner parts with the corrugated iron. Between these two a large space was left for ventilation purposes. As the corrugated iron absorbs the heat more quickly, and on the other hand also cools sooner, circulations of the air are caused, which keep down the temperature between the roof and the ceiling (the pothograph of the Assistant Resident's house at Djocjakarta is an illustration of such a roof). The ventilation is of special importance when the ceilings are also made of sheet iron as this metal very soon conducts the temperature of the space between the roof and the ceiling to the room underneath. When no varandahs are present and the height of the building is such that the walls cannot be protected from the heat of the sun by sufficiently projecting roofs, penthouses are built over the windows and doors so as to prevent the penetration of the sun and rain.

A second precaution, which should be mentioned here, is that, so as to prevent the dwelling houses from becoming damp, an isolation layer is built in the walls to keep the moisture from penetrating into the houses. A layer of from one to two feet in the proximity of the floors, sandwiched with a water-tight mortar, is generally sufficient for this purpose.

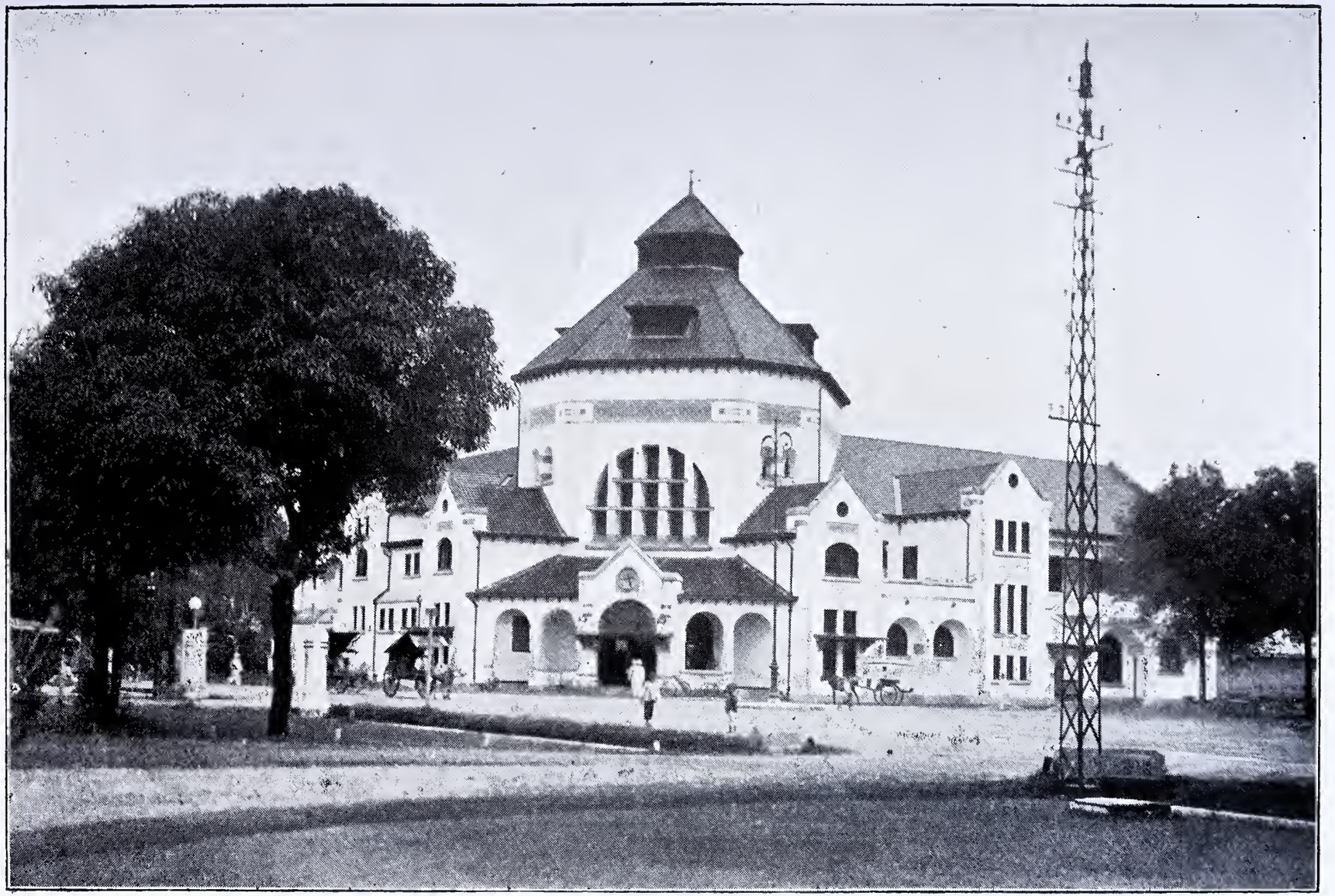
An efficient flow-off of the rainwater should also be provided for. The best way is to have roof gutters and pipes leading to open or closed drains.

Roof-gutters however are not found with the majority of the buildings, but the space round the houses is made with sufficient slope so as to get rid of the rainwater. To protect the lower part of the wall from getting damp, a strip of from 3 to 7 feet round the house should be provided with tiles or otherwise metalled, which as a matter of fact is frequently done.

A very important point is the W. C. arrangement. During the last five years W. C. 's with a water jet have come into use,



The Department of Public Works at Weltevreden.



Post-office at Medan.

although not so generally, as a high pressure water supply can only be obtained in a few places. In such cases it is necessary to have a special water tank, to be filled by means of a hand pump. In many cases however it is not necessary to use W. C.'s with a water jet, that is to say, in places where current water is available. This current water is conducted through concrete drains underneath the W. C.'s. This ensures a quick removal of the faeces, which is—as far as the house itself is concerned - the easiest solution of the problem.

This system is adopted in a good many places. When no current water is available special pits are made, which arrangement however as a rule leaves much to be desired. The septic tank sytem has lately been introduced for large building blocks such as for instance the prisons.

It is astonishing why in a country where malaria is so predominant amongst the native population, mosquito doors and windows are so seldom seen in the dwelling houses of the Europeans. This has three reasons. First of all the anopheles remains hidden during the day-time so that then this insect is not troublesome. Secondly people are protected against the mosquitoes during the night by means of mosquito curtains; and finally the mosquito gauze has one drawback, viz: it obstructs sufficient ventilation. Many are of opinion that when mosquito gauze is used, the ventilation surface should be six times the ordinary surface When however the mosquitoes become very troublesome, mosquito gauze is now sometimes applied in the windows and doors, and sometimes between the pillars of the varandah.

It is evident that for offices. schools and other buildings which are only used during the day, the above protective measures against mosquitoes are unnecessary. Only for dwelling houses, and lately also for hospitals and similar institutes they would be essential. In the same way as with the construction of houses, the protection against mosquitoes is very seldom taken into account, practically no measures are taken with a view to earthquakes, although these are from time to time felt all over the Archipelago. Only in the earthquake centres special precautions are considered necassary. No brick walls are made and

the houses there are built of wood and roofed with tiles. Government buildings are during the last few years specially built with a view to possible earthquakes. The foundations are made as strong as possible, and the higher part of the houses is as light as can be arranged. It goes without saying that ferro concrete is very useful in the construction of such houses, but it must be said that special earthquake construction is very rare, as earthquakes are only frequent in very few places.

The foundations require great care in Netherlands East India on the part of the architect. In many places where the soil is clayey and liable to become very dry during the hot season, cracks measuring several yards are sometimes formed. The result of this is that in the dry season it frequently happens that the soil settles and irregularly contracts. Special care must therefore always be taken to have the foundations deep enough so as to avoid the atmospheric influence. This leads very soon to high foundation walls. In order to reduce the expenditure therewith connected as much as possible, it is customary to fill the foundation holes with sand, which, subject to being well washed in, does not change its volume to any appreciable extent.

So as to avoid that the sand should disappear through the cracks in the soil, the foundation holes are dug as wide as possible or provided with some unperishable vegetable material. For this purpose „Indjoeh", a black fibre, is used. This is found between the stem and the leaves of the Arenga palm *(Arenga Saccharifera Lab., Fam. Palmae).*

In those cases where the foundation holes attain a considerable depth and consequently also a considerable width, it has often proved useful to construct heavy supports which must reach the bedrock. Experiments were made lately to the effect that some foundations were constructed with ferro concrete piles on which a grating of the same material was placed. These piles however were not driven in but placed in a bore hole specially made for the purpose.

A later method is the application of ferro concrete strengthened with ribbed plates, which are buried in the ground at a comparatively small depth.

Dwelling house of the Assistent-Resident at Djocjakarta.

The construction of foundations in ferro concrete has not always given satisfaction.

It is very seldom that the foundations of houses can be made without special precautions. As a rule the ground requires artificial improvement before being built on, and this is generally obtained by putting in a layer of some 15 to 25 centimetres of pebbles.

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In the above short description, the circumstances which are to be taken into account by architects in Netherlands East India were briefly sketched. It seems superfluous to give a complete list of the different buildings and structures, as this is not included in the object of this article. The reproductions and photographs speak for themselves.

The majority of the buildings are private, chiefly the smaller ones such as dwelling houses and shops, in the construction of which the architect acts as his own contractor, unless he employs small outside contractors.

The big commercial firms and companies however have since lately entrusted the designing and construction of their buildings to special architectural firms. A few examples of important buildings form the headoffice of the Java Bank in Batavia and the central office of the Netherlands Indian Railway Company at Samarang — as shown by the photographs herewith.

From an architectonic point of view these compare favourably with European and North American buildings.

The Public Work Department is charged with the designing an construction of Government buildings subject to a few exceptions.

A review of the expenditure of the last few years in connection with the more important Government buildings is given as a supplement to this article, showing the amounts actually spent and provided for by the Government Budget.

In some cases the estimated amount could not be spent; in other instances the estimate had to be exceeded when the cost had been underestimated or when the buildings had to be completed sooner than originally expected.

Taken on an average the estimates were fairly correct. It must be borne in mind that the figures do not include the cost of upkeep in connection with existing buildings.

The following is a short description of the organization of the service in charge of the Government Buildings. This subdivision of the Public Work Department is managed by a Head Engineer with several Engineers under him, of which six attend to the Buildings, and one to the water supply etc.

The duty of this subdivision includes:

1o. The examination of all designs and estimates drawn up by the local staff.

2o. The designing of the more important buildings.

The staff for the execution of the various works, ranks as far as Java is concerned under three Head Engineers who are stationed at Batavia, Samarang, and Sourabaya, They are responsible for their own district and are consequently practically always inspecting, whereas during their absence their office is entrusted to the charge of a Senior Engineer. Apart from the Government Buildings, these Head Engineers are responsible for the roads ad bridges, besides similar constructional work.

Altogether there are employed in Java, three Head Engineers, three Engineers, 20 Architects and 105 Inspectors in connection with the buildings only.

Outside of Java it was so far impossible to appoint a special staff. The buildings there are too much scattered. There the engineers, architects and inspectors have to attend to the buildings as well as to the roads, bridges, harbour works, etc.

In these latter islands the staff is divided according to the various civil districts. Their number amounts to three engineers, sixteen architects, 100 inspectors. Sumatra has two Head Engineers of which one is stationed in Medan and the other in Palembang. The other islands beyond Java and Madura are supervised by one Head Engineer, who is stationed in Batavia, and from there makes regular inspection tours.

PUBLIC WORK DEPRTMENT.

Expenditure in connection with new buildings. (Not including upkeep).

Buildings.	1910		1911		1912		1913	
	Estimated	Spent	Estimated	Spent	Estimated	Spent	Estimated	Spent
Dwelling houses. .	$ 311941	$ 232634	$ 397533	$ 330710	$ 668609	$ 569917	$ 748384	$ 634553
Bureaux	307940	381267	550177	473531	755698	456254	818304	635117
Prisons	227912	119063	305450	240315	397102	390936	273089	296730
Police Barracks . . .	51862	18073	55167	41465	36688	59743	227916	88866
Salt Monopoly Buildings	24492	51255	46277	73604	122242	89272	191374	119779
European schools . .	81453	149529	114967	106207	182756	118696	335557	279991
Dutch-Chinese Schools.	1218	860	26385	4834	31128	48670	115510	53525
Native Schools . . .	394855	616364	489691	585991	426352	322151	337449	199836
Sanitary Works . . .	52704	50666	158420	154791	213646	246323	165005	77696
					209453	72850	365236	101794
Sundries	5981	6045	8995	7581	30686	42102	55428	29620
TOTAL	$ 1460358	$ 1625756	$ 2153062	$ 2019029	$ 3074360	$ 2416914	$ 3633252	$ 2517507